The Geographer's Tools

TERMS & NAMES
cartographer
thematic map
map projection

MAIN IDEA

Geographers use maps, globes, charts, graphs, and new technology to learn about and display the features of Earth.

WHY IT MATTERS NOW

Knowing how to use the tools of geography adds to your ability to understand the world.

DATELINE

BABYLONIA, ABOUT 600 B.C.— Palace officials today released the first map of the world seen in this area. As suspected, Babylon lies at the center of the world. The star-shaped map is drawn on a clay tablet disk about four inches high.

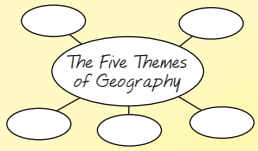
It shows the world surrounded by the Earthly Ocean, which we call the Bitter River. Seven outer regions are also shown as equal triangles rising up out of the oceans. One side of the tablet gives the names of the countries and cities in cuneiform. The other side describes the seven islands. Officials say the map will enable viewers to see the relation of these foreign places to Babylon.

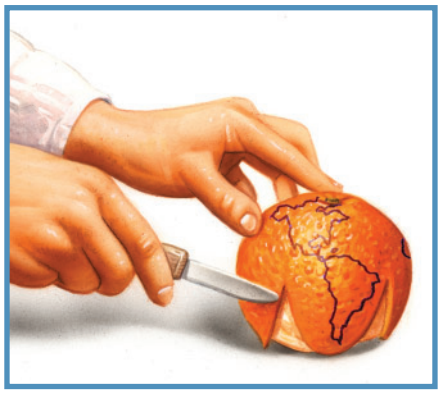
Location • The Babylonian world map was drawn on a clay tablet. ▲

Maps and Globes

People have been drawing maps of their world for thousands of years. Geographers today have many tools, such as remote sensing and the Global Positioning System, to help them represent Earth. Increased knowledge and technology allows a **cartographer,** or mapmaker, to construct maps that give a much more detailed and accurate picture of the world. The "Linking Past and Present" and "Technology: 2004" features on pages 42–44 provide more information on modern mapmaking technology.

TAKING NOTES
Use your web to take notes about the five themes.





Location • Draw a picture on the entire surface of an orange and then peel the orange in one continuous piece. After you lay the peel flat, your image will be distorted.

Differences Between Maps and Globes Both maps and globes represent Earth and its features. A globe is an accurate model of the world because it has three dimensions and can show its actual shape. Globes are difficult to carry around, however. Maps are more practical. They can be folded, carried, hung on a wall, or printed in a book or magazine. However, because maps show the world in only two dimensions, they are not perfectly accurate. Look at the pictures above to see why. When the orange peel is flattened out, the picture on the orange is distorted, or twisted out of shape. Cartographers have the same problem with maps.

Reading Social Studies

A. Clarifying Why does a globe represent Earth better than a map?

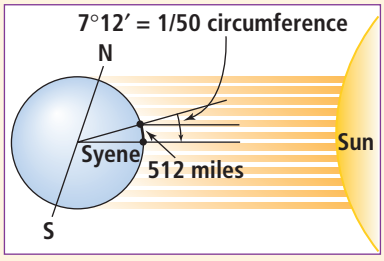
Three Kinds of Maps General reference maps, which show natural and human-made features, are used to locate a place. **Thematic maps** focus on one specific idea or theme. The population map on page 48 is an example of a thematic map. Pilots and sailors use nautical maps to find their way through air and over water. A nautical map is sometimes called a chart.

Location • A road map is a reference map that shows how to get from one place to another. ▼

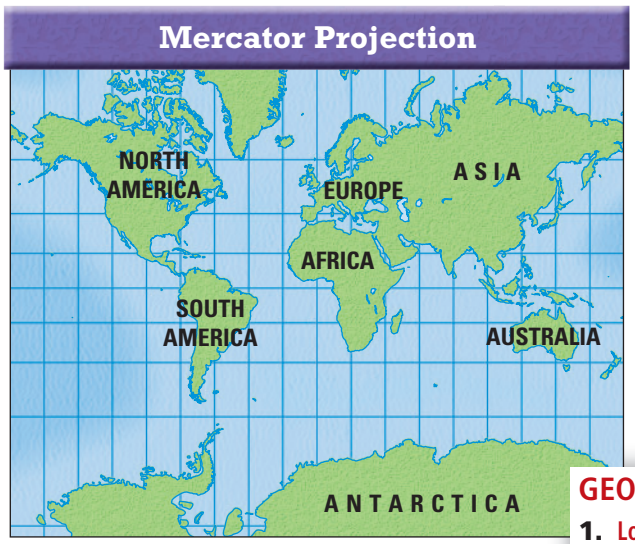
Connections to Math

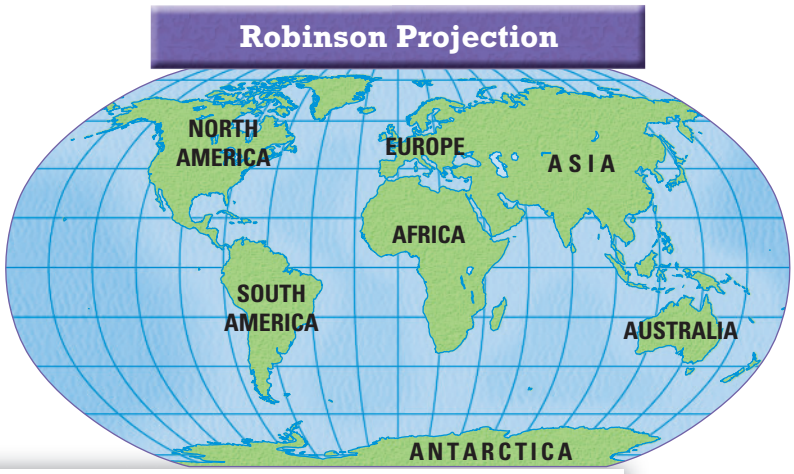
Measuring Earth In 230 B.C., the Greek scientist Eratosthenes used basic geometry to measure the circumference of Earth. Eratosthenes knew that at noon on June 21, the sun cast no shadow in the Egyptian city of Syene (now Aswan). (See the diagram below.) At the same time, the sun cast a shadow of 7°12′ in Alexandria, about 500 miles from Syene.

The circumference of a circle is 360°; 7°12′ is about 2 percent, or 1/50, of 360°. Therefore, he concluded, 500 miles must be about 2 percent of the distance around Earth, which at the equator would be about 25,000 miles.



Road Map of Prince Edward Island, 2002





GEOGRAPHY SKILLBUILDER: Interpreting a Map

1. Location • Compare the size of Africa in relation to other continents on the two projections. How do they differ?
2. Location • What other differences do you notice between the Mercator projection and the Robinson projection?

Reading Social Studies

B. Identifying Problems What are the main problems faced by cartographers?

Map Projections The different ways of showing Earth's curved surface on a flat map are called **map projections.** All projections distort Earth, but different projections distort it in different ways. Some make places look bigger or smaller than they really are in relation to other places. Other projections distort shapes. For more than 400 years, the Mercator projection was most often shown on maps of the world. Recently, the Robinson projection has come into common use because it gives a fairer and more accurate picture of the world.

Spotlight on CULTURE

Mercator Map This map of the Arctic was drawn in 1595 by Gerardus Mercator (1512–1594), the famous mapmaker for whom the map projection was named. It is one of many old maps that are rare, beautiful, and important historical artifacts.

THINKING CRITICALLY

1. **Recognizing Important Details** Does Mercator's map show more land or more water?
2. **Identifying Problems** What types of problems might Mercator have faced when he created this map?

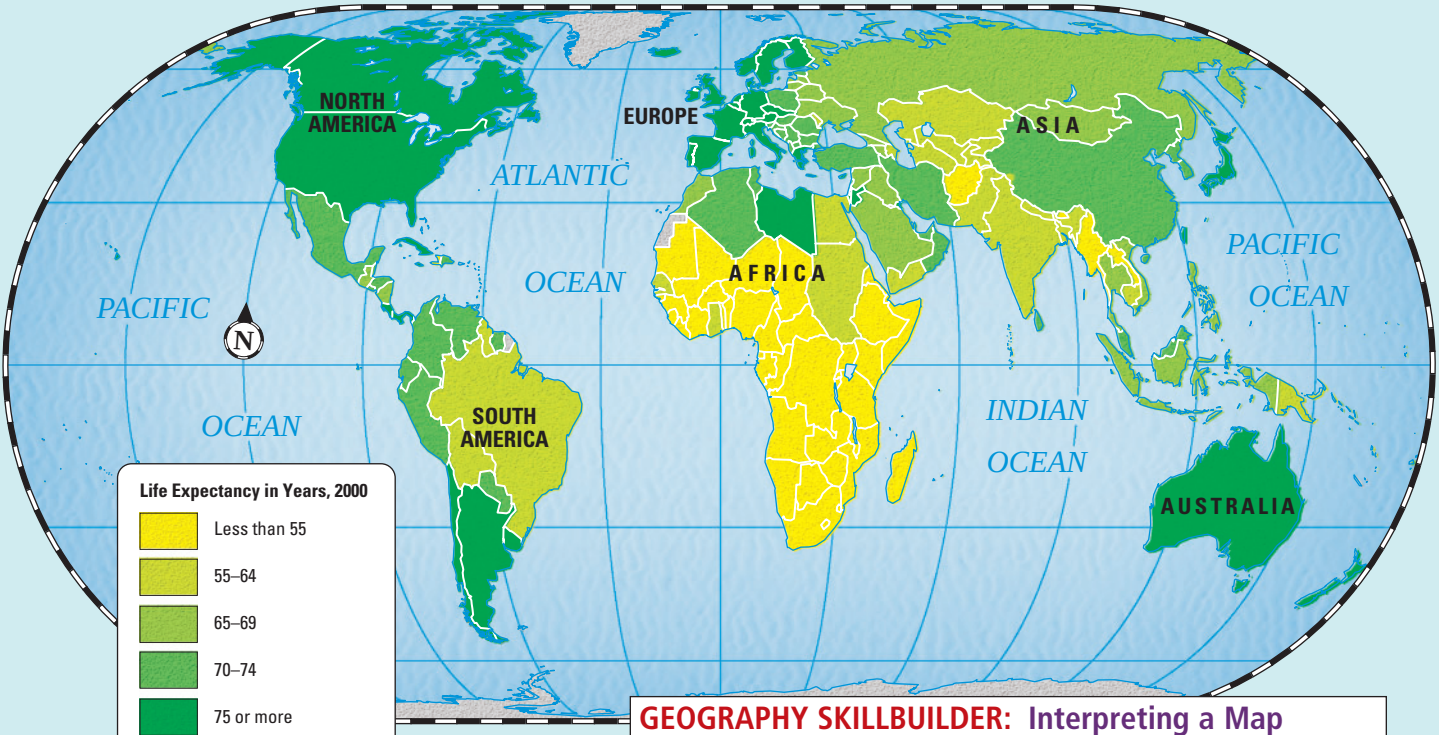
For more on Gerardus Mercator, go to

RESEARCH LINKS CLASSZONE.COM

World Population and Life Expectancy, 2000

Population

Life Expectancy



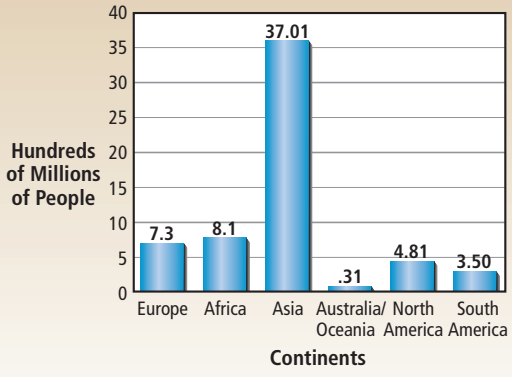
GEOGRAPHY SKILLBUILDER: Interpreting a Map

1. **Region** • Which continent has the largest population? the smallest?
2. **Region** • What is the life expectancy in most parts of North America?

Comparing Maps, Charts, and Graphs

Along with maps, geographers use charts and graphs to display and compare information. The graphs on this page and the maps on page 48 contain related information about the world's population. Notice how each quickly and clearly presents facts that would otherwise take up many paragraphs of text.

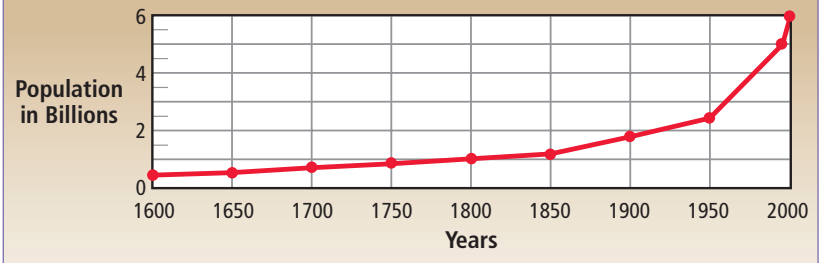
Estimated World Population, 2000, by Continent



SKILLBUILDER: Reading a Graph

1. How many people live in Europe?
2. Which continent has the smallest population?

World Population Growth, 1600–Present



SKILLBUILDER: Reading a Graph

1. How many people lived in the world in 1900?
2. How much did the world's population increase between 1600 and 1900? between 1900 and 2000?

SECTION 2 ASSESSMENT

Terms & Names

1. Explain the significance of: (a) cartographer (b) thematic map (c) map projection

Using Graphics

2. Use a chart like the one below to compare the advantages and disadvantages of maps and globes.

	Maps	Globes
Advantages		
Disadvantages		

Main Ideas

3. (a) What are the differences among the three main kinds of maps?
   (b) How have new tools and knowledge helped cartographers?
   (c) What kinds of information can be displayed in maps and graphs?

Critical Thinking

4. Using Maps

What kind of map would show how many students are in each school in your district?

Think About

- the three kinds of maps
- what information different kinds of population maps show

ACTIVITY -OPTION-

Draw a **map** of the route you take to and from school or some other familiar destination. Include the names of streets, landmarks such as shops and other buildings, and any other useful information.